

**REMARKS**

Applicant wishes to thank the Examiner for the thorough review and consideration of the subject application. The Final Office Action of June 11, 2003, has been received and its contents carefully noted. By this amendment, claims 18, 19, 21, 27, 33, and 36 have been amended. Accordingly, claims 18-19 and 21-38 are currently pending in the application, of which claims 18, 19, 21, 27, 33, and 36 are independent claims.

Entry of the Amendments and Remarks is respectfully requested because entry of Amendment places the present application in *prima facie* condition for allowance, or in the alternative, better form for appeal. Applicant respectfully submits that the above amendments do not add new matter to the application and are fully supported by the specification. Applicant further submits that no issues requiring a further search are presented.

In view of the above amendments and the following Remarks, Applicant respectfully requests reconsideration and timely withdrawal of the pending objections and rejections for the reasons discussed below.

***Rejections Under 35 U.S.C. §103***

Claims 18-19 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over U.S. Patent No. 3,309,437 issued to Harnett (“Harnett”) in view of U.S. Patent No. 4,127,391 issued to Koppelman (“Koppelman”) combined with Great Brittan Patent No. 1,480,690 issued to Madley et al. (“Madley”), and Encyclopedia of Chemical Technology authored by Kirk-Othmer (“Kirk-Othmer”). Applicant respectfully traverses this rejection and requests reconsideration for at least the following reasons.

In making an obviousness rejection under 35 U.S.C. § 103, the Examiner has the burden of establishing (1) some suggestion or motivation to modify the reference or to combine reference teachings, (2) a reasonable expectation of success, and (3) that the prior art references, when combined, teach or suggest all the claim limitations. See MPEP § 2143 (8<sup>th</sup> Ed., Rev. Feb. 2003). Both the suggestion and the reasonable expectation of success must be founded in the prior art, not in the applicant's disclosure.

In the present case, the Examiner has failed to make the requisite showing of a motivation to combine the Harnett, Koppelman, Madley, and Kirk-Othmer. For example, Harnett is directed to making baked or graphitized bodies from raw petroleum coke (column 1, lines 10-11) by heating the raw petroleum coke products to a temperature exceeding 600°C (column 1, lines 56-57) without molding, extruding or mechanical pressure of any kind (column 1, lines 21-22) to form a body with minimum alteration of the pore structure between the particles (column 1, lines 25-30). In substantial contrast, Koppelman teaches a process for making coke from bituminous fines (a different starting material than Madley) by heating the bituminous fines at a temperature of at least 750°C and at a pressure of at least about 1000 psi (Koppelman at column 2, lines 29-40). There is no suggestion in the teachings of Harnett or Koppelman that they may be combined. Koppelman specifically teaches away from the teachings of Harnett. Koppelman expressly requires at least 1000 psi while Harnett expressly teaches no molding, extruding or mechanical pressure of any kind. Given the opposite teachings, different starting materials, and different resultant products of Harnett and Koppelman, one skilled in the art would not be motivated to combine the teachings of Harnett and Koppelman.

Madley is also cited in the rejection and is combined with Harnett and Koppelman. Madley is directed to making a briquetting coal by heating low-rank, high volatile coal particles

in a fluidized bed reactor in the presence of oxygen followed by heating to 600 to 900°C. The coal is then added to caking coal for briquetting by using for example, a double roll press. (Madley at columns 1-2). Madley specifically uses mechanical pressure in forming briquettes, which like Koppelman, teaches away from the teachings of Harnett. Given the opposite teachings of Harnett and Madley, one skilled in the art would not be motivated to combine Harnett and Madley.

Lastly, the Examiner has included Kirk-Othmer in the rejection, combined with Harnett, Koppelman, and Madely. Kirk-Othmer describes properties of coal that make a good coke and describes a test where coal is heated in an open crucible. Given that Harnett is expressly directed to heating raw petroleum coke and Kirk-Othmer is directed to heating coal, a different starting material, one skilled in the art would not be motivated to combine these references. Further, Harnett and Kirk-Othmer produce different materials. Harnett is producing a carbon body with a minimum alteration of pore structure between particles, while Kirk-Othmer is producing coke

Accordingly, Applicant respectfully submits that there is no suggestion or motivation to modify Harnett or to combine reference teachings of Harnett, Koppelman, Madley, and Kirk-Othmer.

Assuming that the combination of references was proper, there is no reasonable expectation of success. For example, Harnett is directed to using raw petroleum coke, heating above 600°C with no pressure, while Koppelman teaches making coke using bituminous fines by heating above 750°C under at least 1000 psi. Based on the teachings of these two references there is no reason to believe that one could take the bituminous fines of Koppelman and expose them to no pressure as taught by Harnett and get the carbon bodies of Harnett. Koppelman teaches exactly the opposite – 1000 psi is required. Madley also teaches using coal and pressure

to form a briquette. Again there is no expectation of success from the teachings of Madley that Madley and Harnett are properly combinable to form the bodies in Harnett.

Kirk-Othmer discloses a test that indicates which coals are best at making coke, while Harnett is starting from raw petroleum coke, completely different starting materials. There is no expectation of success based on the teachings of Harnett and Kirk-Othmer. Further, Kirk-Othmer and Harnett result in different products. With different starting materials and different products, one skilled in the art would not expect a reasonable expectation of success by combining Harnett and Kirk-Othmer. Accordingly, even if there was a motivation to combine the references, given their different starting materials, different produced products, and opposite teachings, there would be no reasonable expectation of success.

Lastly, assuming that the references are properly combinable and there is some expectation of success, the references, when combined, fail to teach or suggest all the claim limitations of claims 18 and 19.

First and foremost, it is important to realize that all of the claims pending in the present application are for carbon foam. Not one single cited reference discloses, teaches, or suggests a carbon foam product or method for making a carbon foam product. Harnett is a carbon body with minimum alteration of the pore structure between particles. Kirk-Othmer makes coke. Madley makes a briquette, and Koppelman makes a coke product from bituminous fines. Accordingly, even if Harnett, Madley, Koppelman, and Kirk-Othmer were combined, none of them disclose, teach or suggest carbon foam as claimed in the present application.

Claim 18 is allowable over the cited references in that claim 18 recites a combination of elements including, for example, "carbon foam produced by heating comminuted swelling coal

particles under a non-oxidizing atmosphere, the atmosphere having a pressure ranging from about 50 psi to about 500 psi, and to a temperature ranging from about 300°C to about 700°C.”

Similarly claim 19 is allowable over the cited reference in that claim 19 recites a combination of element including, for example, “A method for producing carbon foam, comprising the steps of: placing comminuted swelling coal particles in a mold; and heating the comminuted swelling coal particles under a non-oxidizing atmosphere, the atmosphere having a pressure ranging from about 50 psi to about 500 psi, and to a temperature ranging from about 300°C to about 700°C, thereby producing carbon foam.”

None of the cited references either singly or in combination teaches or suggests at least these features. The teachings of each reference are discussed above. None of the references, taken singly or in combination with each other, teach a carbon foam material. Harnett, Koppelman, Madley, and Kirk-Othmer while making some form of mass, fail to teach or disclose carbon foam as required by claim 18 and 19. Additionally, none of the references, taken singly or in combination with each other, teaches the combination of heating swelling comminuted coal particles under a non-oxidizing atmospheric pressure ranging from about 50 psi to about 500 psi in a pressure controlled mold to a temperature ranging from about 300°C to about 700°C. Harnett specifically teaches no pressure, Koppelman teaches pressure above 1000 psi, Madley heats coal particles in oxygen (an oxidizing atmosphere) and teaches using a roll press to form briquettes, and Kirk-Othmer heats coal in a crucible in air (an oxidizing atmosphere) under atmospheric pressure.

Accordingly, the Examiner as failed to establish a *prima facie* case of obviousness and Applicant respectfully requests the rejection for claims 18 and 19 under § 103 be withdrawn.

Claims 21-38 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over U.S. Patent No. 3,309,437 issued to Harnett (“Harnett”) in view of U.S. Patent No. 4,127,391 issued to Koppelman (“Koppelman”) combined with Great Brittan Patent No. 1,480,690 issued to Madley et al. (“Madley”), and Encyclopedia of Chemical Technology authored by Kirk-Othmer (“Kirk-Othmer”). Applicant respectfully traverses this rejection and requests reconsideration for at least the following reasons.

These references are the same references discussed above. With respect to a motivation to combine these references and reasonable expectation of success, Applicant incorporates the arguments above with respect to this rejection.

Claim 21 is allowable over the cited references in that claim 21 recites a combination of elements including, for example, “A method of making carbon foam, comprising the steps of: placing coal particles having a free swell index ranging from about 3.5 to about 5 in a chamber; heating the coal particles to a first temperature under a non-oxidizing atmosphere, wherein the pressure of the non-oxidizing atmosphere ranges from about 50 psi to about 500 psi; and controlling pressure in the chamber, wherein the pressure is maintained below about 500 psi, wherein the steps of controlling pressure and heating the coal particles produces carbon foam.”

Similarly, claim 27 is allowable over the cited references in that claim 27 recites a combination of elements including, for example, “A method of making carbon foam, comprising the steps of: placing swelling bituminous coal particles in a mold; heating the swelling bituminous coal particles under a non-oxidizing atmosphere to a first temperature; and controlling pressure of the non-oxidizing atmosphere in the mold, wherein the pressure is maintained from about 50 psi to about 500 psi, wherein the steps of controlling pressure and heating the bituminous coal particles produces carbon foam.”

None of the cited references discussed above either singly or in combination teaches or suggests at least these features. The teachings of each reference are discussed above. None of the references, taken singly or in combination with each other, teach a method for making a carbon foam material. Harnett, Koppelman, Madley, and Kirk-Othmer while making some form of mass, fail to teach or disclose carbon foam as required by claim 21 and 27. Additionally, none of the cited references, taken singly or in combination with each other, teaches the combination of heating coal particles under a non-oxidizing atmospheric pressure ranging from about 50 psi to about 500 psi to a first temperature. Further, none of the cited references teach or disclose controlling the pressure of the non-oxidizing atmosphere. Harnett specifically teaches no pressure, Koppelman teaches pressure above 1000 psi, Madley heats coal particles in oxygen (an oxidizing atmosphere) and teaches using a roll press to form briquettes, and Kirk-Othmer heats coal in a crucible in air (an oxidizing atmosphere) under atmospheric pressure.

Accordingly, the Examiner as failed to establish a *prima facie* case of obviousness and Applicants respectfully request the rejection for claims 21 and 27 under § 103 be withdrawn. For at least the foregoing reasons, Applicant respectfully submits that claims 21 and 27 and claims 22-26 and 28-32, which depend from claims 21 and 27, respectively are allowable.

Claim 33 is allowable over the cited references in that claim 33 recites a combination of elements including, for example, "Carbon foam, comprising: an open-celled structure produced by heating swelling bituminous coal particles in a mold above about 300°C, under a non-oxidizing atmosphere, the non-oxidizing atmosphere having a pressure ranging from about 50 psi to about 500 psi, wherein the carbon foam has a density ranging from about 0.1 to about 0.6 g/cm<sup>3</sup>."

Similarly, claim 36 is allowable over the cited references in that claim 36 recites a combination of elements including, for example, “Carbon foam, comprising: an open-celled structure produced by heating coal particles having a free swell index between about 3.5 and about 5 in a mold above about 300°C, under a non-oxidizing atmosphere, the non-oxidizing atmosphere having a pressure ranging from about 50 psi to about 500 psi, wherein the carbon foam has a density ranging from about 0.1 to about 0.6 g/cm<sup>3</sup>. ”

None of the cited references discussed above either singly or in combination teaches or suggests at least these features. The teachings of each reference are discussed above. None of the references, taken singly or in combination with each other, teach a carbon foam material. Harnett, Koppelman, Madley, and Kirk-Othmer while making some form of mass, fail to teach or disclose carbon foam as required by claim 33 and 36. Additionally, none of the cited references, taken singly or in combination with each other, teaches an open-celled structure produced by heating coal particles above about 300°C, under a pressurized, non-oxidizing atmosphere having a pressure ranging from about 50 psi to about 500 psi, where the carbon foam has a density ranging from about 0.1 to about 0.6 g/cm<sup>3</sup>. As discussed above, Harnett specifically teaches no pressure, Koppelman teaches pressure above 1000 psi, Madley heats coal particles in oxygen (an oxidizing atmosphere) and teaches using a roll press to form briquettes, and Kirk-Othmer heats coal in a crucible in air (an oxidizing atmosphere) under atmospheric pressure.

The Examiner asserts that a disclosed apparent density of 0.93 g/cm<sup>3</sup> of Harnett renders obvious the claimed density of about 0.1 to about 0.6 g/cm<sup>3</sup>. It was the Examiner’s position that “about 0.8 g/cm<sup>3</sup> suggest the instant claimed 0.6 g/cm<sup>3</sup>. ” Harnett does not teach or suggest a

carbon foam having a density ranging from about 0.1 to about 0.6 g/cm<sup>3</sup>. Harnett simply discloses a density for a carbon mass of 0.93 g/cm<sup>3</sup>.

Since none the references teach or suggest carbon foam having a density ranging from about 0.1 to about 0.6 g/cm<sup>3</sup>, Applicant presumes that the Examiner is making official notice of the assertion that 0.1 to about 0.6 g/cm<sup>3</sup> is suggest by a significantly higher density of 0.93 g/cm<sup>3</sup>. Applicant traverses this assertion and request that the Examiner cite references in support of this assertion. The Examiner may take official notice of facts outside of the record which are capable of instant and unquestionable demonstration as being "well-known" in the art. As set forth in M.P.E.P. § 2144.03, if an applicant traverses an assertion made by an Examiner while taking official notice, the Examiner should cite a reference in support of their assertion.

Accordingly, the Examiner as failed to establish a *prima facie* case of obviousness and Applicant respectfully requests the rejection for claims 33 and 36 under § 103 be withdrawn. For at least the foregoing reasons, Applicant respectfully submits that claims 33 and 36 and claims 34-35 and 37-38, which depend from claims 33 and 36, respectively are allowable.

For the reasons set forth above, Applicant respectfully requests withdrawal of the 35 U.S.C. §103(a) rejection of claims 18, 19, 21-38. Since the none of the other prior art of record, whether taken alone or in any combination, discloses or suggests all the features of the claimed invention, Applicant respectfully submits that independent claims 18, 19, 21, 27, 33, and 36, and all the claims that depend therefrom are allowable.

### **CONCLUSION**

Applicant believes that a full and complete response has been made to the pending Office Action and respectfully submit that all of the stated objections and grounds for rejection have

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been overcome or rendered moot. Accordingly, Applicant respectfully submits that all pending claims are allowable and that the application is in condition for allowance.

Should the Examiner feel that there are any issues outstanding after consideration of this response, the Examiner is invited to contact the Applicant's undersigned representative at the number below to expedite prosecution.

Prompt and favorable consideration of this Reply is respectfully requested.

Respectfully submitted,



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